AMENDED CLAIMS
received by the International Bureau on 10 August 2005 original claims 1-271 have been replaced by amended claims 1-284.

WHAT IS CLAIMED IS:

1. A disc valve system for a piston driven internal combustion engine, said disc valve system comprising:

at least one rotating disc for mounting between a cylinder head manifold comprising exhaust and intake ports and an engine cylinder housing the piston and defining a combustion chamber, said rotating disc comprising sequencing ports so configured as to be brought into periodic communication with said exhaust and intake ports at cyclic intervals of the rotating movement of said rotating disc thereby providing for said exhaust and intake ports to be brought into periodic communication with said combustion chamber; and

an intermediate seal member for mounting in the engine cylinder at a junction of said rotating disc and the engine cylinder so as to seal the combustion chamber, said intermediate seal member comprising a dynamic seal for contact with said rotating disc and a stationary seal for sealing contact with the engine cylinder;

whereby the rotating movement of said rotating disc sequentially opens and closes each said exhaust and intake ports synergistically with the translational movement of the piston

2. A disc valve system according to claim 1, wherein said disc comprises a generally central aperture for being in alignment with an aperture of the cylinder head manifold.

3. A disc valve system according to claim 2, wherein said cylinder head manifold aperture is defined by a spark-plug receiving portion.

4. A disc valve system according to claim 3, wherein said spark-plug receiving portion defines a threaded portion for fixedly receiving a spark-plug.

5. A disc valve system according to claim 2, wherein said cylinder head manifold aperture is defined by a fuel-injector receiving portion.

6. A disc valve system according to claim 5, wherein said fuel-injector receiving portion defines a threaded portion for fixedly receiving a fuel injector

7. A disc valve system according to claim 1, wherein said disc comprises an outer face in a slidable sealing relationship with the cylinder head manifold and an opposite inner face in a slidable relationship with said intermediate seal member.

8. A disc valve system according to claim 7, wherein said outer face comprises a generally central protrusion for slidably mating with a complementary identation within the cylinder head manifold.

9. A disc valve system according to claim 8, wherein said generally central protrusion comprises a tubular shaft.

10. A disc valve system according to claim 9, wherein said tubular shaft defines an aperture for fixedly receiving a spark plug.

11. A disc valve system according to claim 9, wherein said tubular shaft defines an aperture for fixedly receiving a fuel injector.

12. A disc valve system according to claim 7, wherein said outer face comprises a generally circular protrusion for slidably mating with a complementary identation comprised by the cylinder head manifold.

13. A disc valve system according to claim 12, wherein said complementary identation is defined by a layer of material added on the cylinder head manifold.

14. A disc valve system according to claim 13, wherein said layer of material is selected from the group consisting of: copper and anti-friction material.

15. A disc valve system according to claim 12, wherein said complementary identation is formed within the cylinder head manifold.

16. A disc valve system according to claim 7, wherein said inner face comprising a turbulator portion configured to provide for turbulence thereunder during the rotating movement of said disc.

17. A disc valve system according to claim 16, wherein turbulator portion further comprises propeller members.

18. A disc valve system according to claim 16, wherein said turbulator portion comprises a receding region within said inner face.

19. A disc valve system according to claim 18, wherein turbulator portion further comprises propeller members about said receding portion.

20. A disc valve system according to claim 19, wherein said propeller members comprise blade members.

21. A disc valve system according to claim 20, wherein said blade members are generally circular shaped.

22. A disc valve system according to claim 19, wherein said sequencing ports comprise apertures which through said propeller members.

23. A disc valve system according to claim 18, wherein said receding region is generally conical shaped.

24. A disc valve system according to claim 7, wherein said inner face comprises a skirt portion for mating with the engine cylinder.

25. A disc valve system according to claim 24, wherein said skirt portion and the cylinder engine comprise a sealing material therebetween.

26. A disc valve system according to claim 1, wherein said rotating disc comprises gear elements.

27. A disc valve system according to claim 26, wherein said gear elements comprise bevel teeth.

28. A disc valve system according to claim 26, wherein said rotating disc comprises an inner face comprising said gear elements.

29. A disc valve system according to claim 28, wherein said gear element is formed near the periphery of said rotating disc.

30. A disc valve system according to claim 1, wherein said cylinder head manifold and said disc comprise a sealing material therebetween.

31. A disc valve system according to claim 1, wherein said sequencing ports comprise at least one intake sequencing port and at least one exhaust sequencing port.

32. A disc valve system according to claim 1, wherein said sequencing ports comprise apertures.

33. A disc valve system according to claim 32, wherein said sequencing ports comprise respective shutter members.

34. A disc valve system according to claim 33, wherein said shutter are so biased as to at least keep said port apertures partially closed.

35. A disc valve system according to claim 34, wherein said shutters are moveable towards a position that progressively opens said port apertures during the rotating movement of said disc.

36. A disc valve system according to claim 35, wherein a said shutter comprises a moveable member positioned within said aperture, and mounted to a port wall via a biasing member.

37. A disc valve system according to claim 36, wherein said biasing member comprises a spring.

38. A disc valve system according to claim 33, wherein said shutters comprise flaps which are mounted to said disc via a biasing member so biasing said flaps as to at least substantially cover said sequencing port apertures.

39. A disc valve system according to claim 38, wherein said biasing member comprises spring.

40. A disc valve system according to claim 31, wherein during the rotating movement of said disc, said intake sequencing port is brought into periodic communication with said cylinder head intake port and said exhaust sequencing port is brought into periodic communication with said cylinder head exhaust port.

41. A disc valve system according to claim 40, wherein said at least one intake sequencing port and at least one exhaust sequencing port are moved by the rotating movement of said disc along a same orbital.

42. A disc valve system according to claim 40, wherein said at least one least one intake sequencing port and at least one exhaust sequencing port are moved by the rotating movement of said disc along different respective orbitals.

43. A disc valve system according to claim 1, wherein said sequencing ports comprise a plurality of intake sequencing ports and a plurality of exhaust sequencing ports.

44. A disc valve system according to claim 43, wherein said plurality of intake and exhaust sequencing ports are disposed in respective intake and exhaust series on said rotating disc.

45. A disc valve system according to claim 44, wherein said series of said plurality of intake sequencing ports comprises intake ports of different dimensions.

46. A disc valve system according to claim 45, wherein said plurality of intake sequencing ports comprises sequencing ports that increase in size in the direction from the centre of said disc to the periphery of said disc.

47. A disc valve system according to claim 44, wherein said series of said plurality of exhaust sequencing ports comprises exhaust ports of different dimensions.

48. A disc valve system according to claim 47, wherein said plurality of exhaust sequencing ports comprises sequencing ports that increase in size in the direction from the centre of said disc to the periphery of said disc.

49. A disc valve system according to claim 1, wherein the cylinder head manifold comprises liquid bearings on a portion thereof that is in contact with said disc.

50. A disc valve system according to claim 49, wherein said liquid bearings comprise channels formed within said cylinder head manifold portion.

51. A disc valve system according to claim 50, wherein said cylinder head manifold comprises a material plated on said portion, said liquid bearings comprising channels formed within said plated material.

52. A disc valve system according to claim 1, wherein said intermediate seal member comprises a top face, a bottom face and an outer surface therebetween, said top face being in contact with said rotating disc and providing for said disc to rotate with respect thereto.

53. A disc valve system according to claim 52, wherein said intermediate seal member comprises a ring member.

54. A disc valve system according to claim 52, wherein said outer surface comprises said stationary seal.

55. A disc valve system according to claim 54, wherein said stationary seal comprises a ring seal.

56. A disc valve system according to claim 54, wherein said stationary seal seals the internal periphery of the engine cylinder about an opening thereof leading to the combustion chamber.

57. A disc valve system according to claim 54, wherein said stationary seal extends beyond said seal member outer surface.

58. A disc valve system according to claim 54, wherein said stationary seal is slidably mounted on said outer surface

59. A disc valve system according to claim 54, wherein said outer surface comprises a groove to hold said stationary seal.

60. A disc valve system according to claim 59, wherein said groove slidably holds said stationary seal.

61. A disc valve system according to claim 52, wherein said bottom face comprises at least one locking element to be mated with a complementary locking element of the engine cylinder.

62. A disc valve system according to claim 61, wherein at least one said bottom face locking element comprises a recess and said complementary engine cylinder locking element comprises a pin.

63. A disc valve system according to claim 62, wherein said recess is generally vertical with respect to said bottom face.

64. A disc valve system according to claim 62, wherein said recess is generally slanted with respect to said bottom face.

65. A disc valve system according to claim 52, wherein said bottom face comprises a configuration that is complementary to an inner top peripheral region of said cylinder.

66. A disc valve system according to claim 61, wherein said bottom face securely sits on said inner top peripheral region within the engine cylinder.

67. A disc valve system according to claim 1, further comprising a disc-rotator assembly for causing the rotational movement of said rotating disc.

68. A disc valve system according to claim 67, wherein said disc-rotator assembly comprises a transmission assembly, the piston-driven engine comprising a crankshaft mounted to the piston, said transmission assembly being configured to be put in operative communication with the crankshaft and with said rotating disc such that said disc rotates in relation to the revolution of the crankshaft thereby providing for said disc to sequentially open and close each said exhaust and intake ports synergistically with the revolution of the crankshaft.

69. A disc valve system according to claim 68, wherein said transmission assembly comprises a gear assembly, said disc comprising gear elements in operative communication with said gear assembly.

70. A disc valve system according to claim 69, wherein said gear elements comprise bevel teeth.

71. A disc valve system according to claim 69, wherein said gear assembly comprises a first gear in operative communication with said crankshaft, said first gear being in operative communication with a second gear, said second gear being in operative communication with said disc gear elements so as to transmit the movement of the crankshaft to said disc.

72. A disc valve system according to claim 71, wherein said first gear is mounted to said crankshaft.

73. A disc valve system according to claim 71, wherein said gear assembly further comprises a movement-transfer assembly in operative communication with both said first and second gears for transmitting the movement of said first gear to said second gear.

74. A disc valve system according to claim 72, wherein said first and second gears comprise first and second sprocket gears respectively, said movement-transfer assembly comprises a chain member mounted at one end to said first sprocket gear and at an opposite end to said second sprocket gear.

75. A disc valve system according to claim 74, further comprising a tension-assembly being in contact with said chain member as to apply tension thereto thereby interruptingly retarding the rotating movement of said disc at given intervals thereof.

76. A disc valve system according to claim 75, wherein said chain member defines two opposite chain sides between said first and second sprocket gears, said tension-assembly comprising tension elements mounted on said opposite chain sides.

77. A disc valve system according to claim 76, wherein said tension-assembly further comprises a dynamic member mounted to said tension elements.

78. A disc valve system according to claim 77, wherein said dynamic member is made of resilient material.

79. A disc valve system according to claim 77, wherein said tension-assembly comprises first and second opposite tension elements being mounted to a respective chain side, said dynamic member comprising an elongate member having said first and second tension elements mounted at each longitudinal end thereof.

80. A disc valve system according to claim 79, wherein said first and second tension elements are mounted to biasing members for being biased towards a respective said chain side.

81. A disc valve system according to claim 80, wherein said biasing members comprise tension springs.

82. A disc valve system according to claim 79, wherein said first and second tension elements are so positioned and wherein said dynamic member is so configured as to collectively and reciprocally move side-to-side when said chain member acts on at least one of said first and second tension elements.

83. A disc valve system according to claim 82, wherein said reciprocal movement provides for applying interrupted pressure on a each of said chain sides at a time and at substantially regular intervals during the rotating movement of said disc.

84. A disc valve system according to claim 79, wherein said tension elements are mounted on the outer face of said chain sides, said dynamic member comprising openings near said each longitudinal ends receiving said chain sides therethrough without interfering therewith.

85. A disc valve system according to claim 79, wherein said dynamic member comprises a generally elliptical shape defining an elliptical opening providing a free working space for said chain member.

86. A disc valve system according to claim 74, wherein said second sprocket gear is in operative communication with a disc-gear, said disc gear being in operative communication with said disc gear elements.

87. A disc valve system according to claim 86, wherein said second sprocket gear comprises an aperture for receiving an extending portion from said disc gear.

88. A disc valve system according to claim 87, wherein said second sprocket gear comprises a resilient member interposed between said second sprocket gear and said extending portion.

89. A disc valve system according to claim 88, wherein said sprocket gear comprises a hub for holding said resilient member.

90. A disc valve system according to claim 89, wherein said resilient member defines an aperture for receiving said extending portion.

91. A disc valve system according to claim 89, wherein said resilient member comprises a synthetic rubber material.

92. A disc valve system according to claim 86, wherein said disc-gear comprises a pinion gear and said disc gear elements comprise bevel teeth.

93. A disc valve system according to claim 74, wherein said at least one of said first and second sprocket gears comprises a resilient member.

94. A disc valve system according to claim 93, wherein said resilient member of said first sprocket gear is interposed therebetween and said crankshaft.

95. A disc valve system according to claim 93, wherein said resilient member of said second sprocket gear is interposed therebetween and a disc-gear in communication with said disc-gear elements.

96. A disc valve system according to claim 73, wherein said movement transfer assembly comprises an elongate member being rotatable about its longitudinal axis, said elongate member comprising first and second elongate member gears at the longitudinal ends thereof, said first and second elongate member gears being in operative communication with said first and second gears respectively.

97. A disc valve system according to claim 96, wherein said first and second elongate member gears first and second pinion gears respectively, said first and second gears comprising respective bevel teeth, said first and second gear bevel teeth being meshed with said first and second pinion gears respectively.

98. A disc valve system according to claim 96, wherein said second gear is in operative communication with a disc gear, said disc gear being in operative communication with said disc gear elements.

99. A disc valve system according to claim 98, wherein said disc gear comprises a disc pinion gear and said disc gear elements comprise gear teeth.

100. A disc valve system according to claim 97, wherein said disc pinion gear is mounted to said second gear.

101. A disc valve system according to claim 91, wherein said movement-transfer assembly comprises a plurality of communicating gears.

102. A piston driven internal combustion engine comprising:

at least one cylinder head manifold comprising exhaust and intake ports;

at least one engine cylinder housing a piston and defining a combustion chamber,

at least one rotating disc mounted between said cylinder head manifold and said engine cylinder, said rotating disc comprising sequencing ports so configured as to be brought into periodic communication with said exhaust and intake ports at cyclic intervals of the rotating movement of said rotating disc thereby providing for said exhaust and intake ports to be brought into periodic communication with said combustion chamber; and

an intermediate seal member mounted within said said engine cylinder at a junction of said rotating disc and said engine cylinder so as to seal said combustion chamber, said intermediate seal member comprising a dynamic seal for contact with said rotating disc and a stationary seal for sealing contact with said engine cylinder;

whereby the rotating movement of said rotating disc sequentially opens and closes each said exhaust and intake ports synergistically with the translational movement of said piston.

103. An engine according to claim 102, wherein said disc comprises a generally central aperture for being in alignment with an aperture of said cylinder head manifold.

104. An engine according to claim 103, wherein said cylinder head manifold aperture is defined by a spark-plug receiving portion.

105. An engine according to claim 104, wherein said spark-plug receiving portion defines a threaded portion for fixedly receiving a spark plug.

106. An engine according to claim 103, wherein said cylinder head manifold aperture is defined by a fuel-injector receiving portion.

107. An engine according to claim 106, wherein said fuel-injector receiving portion defines a threaded portion for fixedly receiving a fuel injector

108. An engine according to claim 102, wherein said disc comprises an outer face in a slidable sealing relationship with said cylinder head manifold and an opposite inner face in a slidable relationship with said intermediate seal member.

109. An engine according to claim 108, wherein said outer face comprises a generally central protrusion for slidably mating with a complementary identation within the cylinder head manifold.

110. An engine according to claim 109, wherein said generally central protrusion comprises a tubular shaft.

111. An engine according to claim 110, wherein said tubular shaft defines an aperture for fixedly receiving a spark plug.

112. An engine according to claim 111, wherein said tubular shaft defines an aperture for fixedly receiving a fuel injector.

113. An engine according to claim 109, wherein said outer face comprises a generally circular protrusion for slidably mating

with a complementary identation comprised by said cylinder head manifold.

114. An engine according to claim 113, wherein said complementary identation is defined by a layer of material added on said cylinder head manifold.

115. An engine according to claim 113, wherein said layer of material is selected from the group consisting of copper,

116. An engine according to claim 112, wherein said complementary identation is formed within the cylinder head manifold.

117. An engine according to claim 108, wherein said inner face comprises a turbulator portion configured to provide for turbulence thereunder during the rotating movement of said disc.

118. An engine according to claim 117, wherein turbulator portion further comprises propeller members.

119. An engine according to claim 117, wherein said turbulator portion comprises a receding region within said inner face.

120. An engine according to claim 119, wherein turbulator portion further comprises propeller members about said receding portion.

121. An engine according to claim 120, wherein said propeller members comprise blade members.

122. An engine according to claim 121, wherein said blade members are generally circular shaped.

123. An engine according to claim 120, wherein said sequencing ports comprise apertures which through said propeller members.

124. An engine according to claim 119, wherein said receding region is generally conical shaped.

125. An engine according to claim 108, wherein said inner face comprises a skirt portion for mating with said engine cylinder.

126. An engine according to claim 125, wherein said skirt portion and the cylinder engine comprise a sealing material therebetween.

127. An engine according to claim 102, wherein said rotating disk comprises gear elements.

128. An engine according to claim 127, wherein said gear elements comprise bevel teeth.

129. An engine according to claim 127, wherein said rotating disc comprises an inner face comprising said gear elements.

130 An engine according to claim 129, wherein said gear element is formed near the periphery of said rotating disc.

131. An engine according to claim 102, wherein said cylinder head manifold and said disc comprise a sealing material therebetween.

132. An engine according to claim 102, wherein said sequencing ports comprise at least one intake sequencing port and at least one exhaust sequencing port.

133. An engine according to claim 102, wherein said sequencing ports comprise apertures.

134. An engine according to claim 133, wherein said sequencing ports comprise respective shutter members.

135. An engine according to claim 136, wherein said shutter is so biased as to at least keep said port apertures partially closed.

136. An engine according to claim 135, wherein said shutter members are moveable towards a position that progressively opens said port apertures during the rotating movement of said disc.

137. An engine according to claim 136, wherein said shutter member comprises a moveable member positioned within said aperture, and mounted to a port wall via a biasing member.

138. An engine according to claim 133, wherein said biasing member comprises a spring.

139. An engine according to claim 134, wherein said shutters comprise flaps which are mounted to said disc via a biasing member so biasing said flaps as to at least partially cover said sequencing port apertures.

140. An engine according to claim 139, wherein said biasing member comprises a spring.

141. An engine according to claim 132, wherein during the rotating movement of said disc, said intake sequencing port is brought into periodic communication with said cylinder head intake port and said exhaust sequencing port is brought into periodic communication with said cylinder head exhaust port.

142. An engine according to claim 141, wherein said at least one intake sequencing port and at least one exhaust sequencing port are moved by the rotating movement of said disc along a same orbital.

143. An engine according to claim 141, wherein said at least one least one intake sequencing port and at least one exhaust sequencing port are moved by the rotating movement of said disc along different respective orbitals.

144. An engine according to claim 102, wherein said sequencing ports comprise a plurality of intake sequencing ports and a plurality of exhaust sequencing ports.

145. An engine according to claim 144, wherein said plurality of intake and exhaust sequencing ports are disposed in respective intake and exhaust series on said rotating disc.

146. An engine according to claim 145, wherein said series of said plurality of intake sequencing ports comprises intake sequencing ports of different dimensions.

147. An engine according to claim 146, wherein said plurality of intake sequencing ports comprises sequencing ports that increase in size in the direction from the centre of said disc to the periphery of said disc.

148. An engine according to claim 145, wherein said series of said plurality of exhaust sequencing ports comprises exhaust sequencing ports of different dimensions.

149. An engine according to claim 148, wherein said plurality of exhaust sequencing ports comprises sequencing ports that increase in size in the direction from the centre of said disc to the periphery of said disc.

150. An engine according to claim 102, wherein the cylinder head manifold comprises liquid bearings on a portion thereof that is in contact with said disc.

151. An engine according to claim 150, wherein said liquid bearings comprise channels formed within said cylinder head manifold portion.

152. An engine according to claim 151, wherein said cylinder head manifold comprises a material plated on said portion, said liquid bearings comprising channels formed within said plated material.

153. An engine according to claim 102, wherein said intermediate seal member comprises a top face, a bottom face and an outer surface therebetween, said top face being in contact with said rotating disc and providing for said disc to rotate with respect thereto.

154. An engine according to claim 153, wherein said intermediate seal member comprises a ring member.

155. An engine according to claim 153, wherein said outer surface comprises said stationary seal.

156. An engine according to claim 155, wherein said stationary seal comprises a ring seal.

157. An engine according to claim 155, wherein said stationary seal seals the internal periphery of the engine cylinder about an opening thereof leading to said combustion chamber.

158. An engine according to claim 155, wherein said stationary seal extends beyond said seal member outer surface.

159. An engine according to claim 155, wherein said stationary seal is slidably mounted on said outer surface

160. An engine according to claim 155, wherein said outer surface comprises a groove to hold said stationary seal.

161. An engine according to claim 160, wherein said groove slidably holds said stationary seal.

162. An engine according to claim 153, wherein said bottom face comprises at least one locking element to be mated with a complementary locking element of the engine cylinder.

163. An engine according to claim 162, wherein at least one said bottom face locking element comprises a recess and said complementary engine cylinder locking element comprises a pin.

164. An engine according to claim 163, wherein said recess is generally vertical with respect to said bottom face.

165. An engine according to claim 163, wherein said recess is generally slanted with respect to said bottom face.

166. An engine according to claim 153, wherein said bottom face comprises a configuration that is complementary to an inner top peripheral region of said cylinder.

167. An engine according to claim 162, wherein said bottom face securely sits on said inner top peripheral region within the engine cylinder.

168. An engine according to claim 102, further comprising a disc-rotator assembly for causing the rotational movement of said rotating disc.

169. An engine according to claim 168, further comprising a crankshaft mounted to said piston, said disc-rotator assembly comprises a transmission assembly being configured to be put in operative communication with said crankshaft and with said rotating disc such that said disc rotates in relation to the revolution of said crankshaft, thereby providing for said disc to sequentially open and close each said exhaust and intake ports synergistically with the revolution of said crankshaft.

170. An engine according to claim 169, wherein said transmission assembly comprises a gear assembly, said disc comprising gear elements in operative communication with said gear assembly.

171. An engine according to claim 170, wherein said gear elements comprise bevel teeth.

172. An engine according to claim 170, wherein said gear assembly comprises a first gear in operative communication with said crankshaft, said first gear being in operative communication with a

second gear, said second gear being in operative communication with said disc gear elements so as to transmit the movement of said crankshaft to said disc.

173. An engine according to claim 172, wherein said first gear is mounted to said crankshaft.

174. An engine according to claim 172, wherein said gear assembly further comprises a movement-transfer assembly in operative communication with both said first and second gears for transmitting the movement of said first gear to said second gear.

175. An engine according to claim 173, wherein said first and second gears comprise first and second sprocket gears respectively, said movement-transfer assembly comprises a chain member mounted at one end to said first sprocket gear and at an opposite end to said second sprocket gear.

176. An engine according to claim 175, further comprising a tension-assembly being in contact with said chain member as to apply tension thereto thereby interruptingly retarding the rotating movement of said disc at given intervals thereof.

177. An engine according to claim 176, wherein said chain member defines two opposite chain sides between said first and second sprocket gears, said tension-assembly comprising tension elements mounted on said opposite chain sides.

178. An engine according to claim 177, wherein said tension-assembly further comprises a dynamic member mounted to said tension elements.

179. An engine according to claim 178, wherein said dynamic member is made of resilient material.

180. An engine according to claim 178, wherein said tension-assembly comprises first and second opposite tension elements being mounted to a respective chain side, said dynamic member comprising an elongate member having said first and second tension elements mounted at each longitudinal end thereof.

181. An engine according to claim 180, wherein said first and second tension elements are mounted to biasing members for being biased towards a respective said chain side.

182. An engine according to claim 181, wherein said biasing members comprise tension springs.

183. An engine according to claim 180, wherein said first and second tension elements are so positioned and wherein said dynamic member is so configured as to collectively and reciprocally move side-to-side when said chain member acts on at least one of said first and second tension elements.

184. An engine according to claim 183, wherein said reciprocal movement provides for applying interrupted pressure on a

each of said chain sides at a time and at substantially regular intervals during the rotating movement of said disc.

185. An engine according to claim 180, wherein said tension elements are mounted on the outer face of said chain sides, said dynamic member comprising openings near said each longitudinal ends receiving said chain sides therethrough without interfering therewith.

186. An engine according to claim 180, wherein said dynamic member comprises a generally elliptical shape defining an elliptical opening providing a free working space for said chain member.

187. An engine according to claim 175, wherein said second sprocket gear is in operative communication with a disc-gear, said disc gear being in operative communication with said disc gear elements.

188. An engine according to claim 187, wherein said second sprocket gear comprises an aperture for receiving an extending portion from said disc gear.

189. An engine according to claim 188, wherein said second sprocket gear comprises a resilient member interposed between said second sprocket gear and said extending portion.

190. An engine according to claim 189, wherein said sprocket gear comprises a hub for holding said resilient member.

191. An engine according to claim 190, wherein said resilient member defines an aperture for receiving said extending portion.

192. An engine according to claim 191, wherein said resilient member comprises a material selected from the group consisting of natural rubber, synthetic rubber and combinations thereof.

193. An engine according to claim 179, wherein said disc-gear comprises a pinion gear and said disc gear elements comprise gear teeth.

194. An engine according to claim 175, wherein said at least one of said first and second sprocket gears comprises a resilient member.

195. An engine according to claim 197, wherein said resilient member of said first sprocket gear is interposed therebetween and said crankshaft.

196. An engine according to claim 194, wherein said resilient member of said second sprocket gear is interposed therebetween and a disc-gear in communication with said disc-gear elements.

197. An engine according to claim 177, wherein said movement transfer assembly comprises an elongate member being rotatable about its longitudinal axis, said elongate member comprising

first and second elongate member gears at the longitudinal ends thereof, said first and second elongate member gears being in operative communication with said first and second gears respectively.

198. An engine according to claim 197, wherein said first and second elongate member gears first and second pinion gears respectively, said first and second gears comprising respective bevel teeth, said first and second gear bevel teeth being meshed with said first and second pinion gears respectively.

199. An engine according to claim 197, wherein said second gear is in operative communication with a disc gear, said disc gear being in operative communication with said disc gear elements.

200. An engine according to claim 199, wherein said disc gear comprises a disc pinion gear and said disc gear elements comprise gear teeth.

201. An engine according to claim 198, wherein said disc pinion gear is mounted to said second gear.

202. An engine according to claim 169, wherein said transmission assembly comprises a plurality of communicating gears.

203. A rotatable disc valve for mounting between a cylinder head manifold having exhaust and intake ports and an engine cylinder housing a piston and defining a combustion chamber of a piston driven internal combustion engine, said disc valve comprising:

an outer face facing the cylinder head manifold when said disc valve is mounted thereto;

an inner face facing the engine cylinder when said disc valve is mounted thereto, said inner face comprising a turbulator; and

sequencing ports so configured as to be brought into periodic communication with said exhaust and intake ports at cyclic intervals of the rotating movement of said disc thereby providing for said exhaust and intake ports to be brought into periodic communication with said combustion chamber;

whereby said turbulator portion is configured to provide for turbulence thereunder during the rotating movement of said disc.

204. A disc valve according to claim 203, wherein said disc valve further comprises a generally central aperture for being in alignment with an aperture of the cylinder head manifold.

205. A disc valve according to claim 204, wherein said turbulator portion is formed about said generally central aperture.

206. A disc valve according to claim 203, wherein turbulator portion comprises propeller members.

207. A disc valve according to claim 203, wherein said turbulator portion comprises a receding region within said inner face.

208. A disc valve according to claim 207, wherein turbulator portion further comprises propeller members about said receding portion.

209. A disc valve according to claim 208, wherein said propeller members comprise blade members.

210. A disc valve according to claim 209, wherein said blade members are generally circular shaped.

211. A disc valve according to claim 208, wherein said sequencing ports comprise apertures through said propeller members.

212. A disc valve according to claim 204, wherein said receding region is generally conical shaped.

213. A disc valve according to claim 203, wherein said outer face comprises a generally central protrusion for slidably mating with a complementary identation within the cylinder head manifold.

214. A disc valve according to claim 213, generally central protrusion comprises a tubular shaft.

215. A disc valve according to claim 214, wherein said tubular shaft defines an aperture for fixedly receiving a spark plug.

216. A disc valve according to claim 214, wherein said tubular shaft defines an aperture for fixedly receiving a fuel injector.

217. A disc valve system according to claim 203, wherein said outer face comprises a generally circular protrusion for slidably mating with a complementary identation comprised by the cylinder head manifold.

218. A disc valve according to claim 203, wherein said inner face comprises a skirt portion for mating with the engine cylinder.

219. A disc valve according to claim 203, further comprising gear elements.

220. A disc valve according to claim 219, wherein said gear elements comprise bevel teeth.

221. A disc valve according to claim 219, said inner face comprises said gear elements.

222. A disc valve according to claim 219, wherein said gear elements are formed near the periphery of said disc valve.

223. A disc valve according to claim 203, wherein said sequencing ports comprise at least one intake sequencing port and at least one exhaust sequencing port.

224. A disc valve according to claim 203, wherein said sequencing ports comprise apertures.

225. A disc valve according to claim 224, wherein said sequencing ports comprise respective shutter members.

226. A disc valve according to claim 225, wherein said shutter are so biased as to at least keep said port apertures partially closed.

227. A disc valve according to claim 226, wherein said shutters are moveable towards a position that progressively opens said port apertures during the rotating movement of said disc valve.

228. A disc valve according to claim 227, wherein a said shutter comprises a moveable member positioned within said aperture, and mounted to a port wall via a biasing member.

229. A disc valve according to claim 228, wherein said biasing member comprises a spring.

230. A disc valve according to claim 225, wherein said shutters comprise flaps which are mounted to said disc via a biasing member so biasing said flaps as to at least partially cover said sequencing port apertures.

231. A disc valve according to claim 230, wherein said biasing member comprises a spring.

232. A disc valve according to claim 223, wherein during the rotating movement of said disc, said intake sequencing port is brought into periodic communication with said cylinder head intake

port and said exhaust sequencing port is brought into periodic communication with said cylinder head exhaust port.

233. A disc valve according to claim 232, wherein said at least one intake sequencing port and at least one exhaust sequencing port are moved by the rotating movement of said disc along a same orbital.

234. A disc valve according to claim 232, wherein said at least one intake sequencing port and at least one exhaust sequencing port are moved by the rotating movement of said disc along different respective orbitals.

235. A disc valve according to claim 203, wherein said sequencing ports comprise a plurality of intake sequencing ports and a plurality of exhaust sequencing ports.

236. A disc valve according to claim 235, wherein said plurality of intake and exhaust sequencing ports are disposed in respective intake and exhaust series on said rotating disc.

237. A disc valve according to claim 236, wherein said series of said plurality of intake sequencing ports comprises intake ports of different dimensions.

238. A disc valve according to claim 237, wherein said plurality of intake sequencing ports comprises sequencing ports that increase in size in the direction from the centre of said disc to the periphery of said disc.

239. A disc valve according to claim 236, wherein said series of said plurality of exhaust sequencing ports comprises exhaust ports of different dimensions.

240. A disc valve according to claim 239, wherein said plurality of exhaust sequencing ports comprises sequencing ports that increase in size in the direction from the centre of said disc to the periphery of said disc.

241. A rotatable disc valve for mounting between a cylinder head manifold having exhaust and intake ports and an engine cylinder housing a piston and defining a combustion chamber of piston driven internal combustion engine, said disc comprising:

sequencing port apertures so configured as to be brought into periodic communication with said exhaust and intake ports at cyclic intervals of the rotating movement of said disc thereby providing for said exhaust and intake ports to be brought into periodic communication with said combustion chamber, said sequencing port apertures comprising respective shutter members biased towards a first positioned which at least keeps a respective port aperture partially closed;

whereby said shutter members are moveable towards a position that progressively opens said port apertures during the rotating movement of said disc valve.

242. A disc valve according to claim 241, wherein a given said shutter member comprises a moveable member positioned within said aperture and mounted to a port wall via a biasing member.

243. A disc valve according to claim 242, wherein said biasing member comprises a spring.

244. A disc valve according to claim 241, wherein said shutter members comprise flaps which are mounted to said disc via a biasing member so biasing said flaps as to at least partially cover said sequencing port apertures.

245. A disc valve according to claim 244, wherein said biasing member comprises a spring.

246. A rotatable disc valve for mounting between a cylinder head manifold having exhaust and intake ports and an engine cylinder housing a piston and defining a combustion chamber of piston driven internal combustion engine, said disc comprising:

a plurality of intake and exhaust sequencing ports of differing dimensions being disposed in respective intake and exhaust series, said intake and exhaust sequencing port apertures being so configured as to be respectively brought into periodic communication with said exhaust and intake ports at cyclic intervals of the rotating movement of said disc thereby providing for said exhaust and intake ports to be brought into periodic communication with said combustion chamber.

247. A disc valve according to claim 246, wherein said plurality of intake sequencing ports comprises sequencing ports that increase in size in the direction from the centre of said disc to the periphery of said disc valve.

248. A disc valve according to claim 246, wherein said plurality of intake sequencing ports comprise sequencing ports that decrease in size in the direction from the centre of said disc to the periphery of said disc valve.

249. A disc valve according to claim 246, wherein said plurality of exhaust sequencing ports comprises sequencing ports that increase in size in the direction from the centre of said disc to the periphery of said disc valve.

250. A disc valve according to claim 246, wherein said plurality of exhaust sequencing ports comprise sequencing ports that decrease in size in the direction from the centre of said disc to the periphery of said disc valve.

251. A rotatable disc valve for mounting between a cylinder head manifold having exhaust and intake ports and an engine cylinder housing a piston and defining a combustion chamber of piston driven internal combustion engine, said disc comprising:

an outer face facing the cylinder head manifold when said disc valve is mounted thereto;

sequencing port apertures so configured as to be brought into periodic communication with said exhaust and intake ports at cyclic intervals of the rotating movement of said disc thereby providing for said exhaust and intake ports to be brought into periodic communication with said combustion chamber,

said outer face comprising a generally circular protrusion closer to the periphery of said disc valve than to said centre

thereof for mating with a complementary identation formed in the cylinder head manifold.

252. An intermediate seal member for a piston-driven combustion engine comprising a rotating disc valve and an engine cylinder defining a combustion chamber and housing a piston, said intermediate seal member being mountable within the engine cylinder at a junction of the rotating disc valve and the engine cylinder, said intermediate seal member comprising a dynamic seal for contact with the rotating disc valve and a stationary seal for sealing contact with the engine cylinder, wherein during operation of the piston-driven combustion engine, said intermediate seal member seals the combustion chamber.

253. An intermediate seal member according to claim 252, wherein said intermediate seal member comprises a ring member.

254. An intermediate seal member according to claim 252, wherein said intermediate seal member comprises a top face, a bottom face and an outer surface therebetween, said top face being in contact with said rotating disc and providing for said disc to rotate with respect thereto.

255. An intermediate seal member according to claim 254, wherein said outer surface comprises said stationary seal.

256. An intermediate seal member according to claim 255, wherein said stationary seal comprises a ring seal.

257. An intermediate seal member according to claim 255, wherein said stationary seal seals the internal periphery of the engine cylinder about an opening thereof leading to the combustion chamber.

258. An intermediate seal member according to claim 255, wherein said stationary seal extends beyond said seal member outer surface.

259. An intermediate seal member according to claim 255, wherein said stationary seal is slidably mounted on said outer surface

260. An intermediate seal member according to claim 255, wherein said outer surface comprises a groove to hold said stationary seal.

261. An intermediate seal member according to claim 260, wherein said groove slidably holds said stationary seal.

262. An intermediate seal member according to claim 254, wherein said bottom face comprises at least one locking element to be mated with a complementary locking element of the engine cylinder.

263. An intermediate seal member according to claim 262, wherein said at least one bottom face locking element comprises a recess and said complementary engine cylinder locking element comprises a pin.

264. An intermediate seal member according to claim 263, wherein said recess is generally vertical with respect to said bottom face.

265. An intermediate seal member according to claim 263, wherein said recess is generally slanted with respect to said bottom face.

266. An intermediate seal member according to claim 254, wherein said bottom face comprises a configuration that is complementary to an inner top peripheral region of said cylinder.

267. An intermediate seal member according to claim 266, wherein said bottom face securely sits on said inner top peripheral region within the engine cylinder.

268. A timing gear for a disc valve engine, said timing gear having a hub aligned concentrically about its axis of rotation, said hub holding a resilient member, said timing gear rotatively mounted on a timing shaft, said timing shaft comprising a bevel gear fixedly attached at one end and a plurality of lateral members fixedly attached at the opposite end, said lateral members passing through the center of said resilient member and in contact with a plurality of recessed niches in said resilient member.

269. A timing gear according to claim 268, wherein said pinion bevel gear turning said bevel gear comprises a worm gear pinion turning a worm gear.

270. A timing gear according to claim 268, wherein said resilient member comprises material selected from the group consisting of a natural rubber compound, a synthetic rubber and combinations thereof.

271. A timing gear according to claim 268, wherein said resilient member is fixedly secured by a plurality of matching interfacing sector contours configured in said resilient member and reversely contoured in said hub.

272. A disc valve system for piston driven internal combustion engine operating on the stroke thermodynamic principle, said disc valve system comprising:

a disc rotatively mounted between the cylinder head and engine cylinder of the piston driven internal combustion engine, the engine cylinder defining a combustion chamber with said disc, the cylinder head comprising exhaust and intake ports, said disc comprising gear elements so configured as to be made to rotate in a synergistic relationship with the crankshaft of the engine and at a predetermined fraction of a revolution to each one full revolution of the crankshaft, said disc comprising a number of ports spaced apart at predetermined intervals, and

an intermediate seal member for mounting within the engine cylinder at a junction of said disc and the engine cylinder so as to seal the combustion chamber, said intermediate seal member comprising a dynamic seal for contact with said disc and a stationary seal for sealing contact with the engine cylinder;

wherein, during rotation of said disc, said disc ports are brought into periodic alignment with said exhaust and intake ports

at cyclic intervals, thereby, bringing the combustion chamber into periodic communication with said exhaust and intake ports synergistically with the stroke thermodynamic principle, said cyclic intervals being determined by:

- said synergistic relationship between the crankshaft and said disc;
- the disposition, configuration and number of said disc ports; and
- the disposition, configuration and number of said exhaust and intake ports.

273. A disc valve system according to claim 272 further comprising a disc rotator in communication with said gear elements and the crankshaft so as to transfer the movement of the crankshaft to said disc, wherein the configuration of the disc rotator is also determinant of said cyclic intervals.

274. A multifunctional disc for mounting between a cylinder head manifold having exhaust and intake ports and an engine cylinder housing a piston and defining a combustion chamber of a piston driven internal combustion engine, said disc comprising:

a generally flat and single integral body having one face in rotational contact with the cylinder head and an opposite face in rotational contact with the engine cylinder when said disc valve disc is mounted between the cylinder head and the engine cylinder; said body comprising:

a gear comprising gear elements near the periphery of said disc body for providing rotational movement to said disc body;

a valve comprising sequencing ports so configured as to be brought into periodic communication with said exhaust and intake ports at cyclic intervals of the rotating movement of said disc body thereby providing for said exhaust and intake ports to be brought into periodic communication with the combustion chamber;

a turbulator configured to provide turbulence in the combustion chamber during the rotating movement of said disc body; and

a seal for sealing the open portion of the engine cylinder, said seal comprising an indentation for receiving the rim of the engine cylinder.

275. An intermediate seal member for a piston-driven combustion engine comprising a rotating disc valve and an engine cylinder defining a combustion chamber and housing a piston, said intermediate seal member being mountable within the engine cylinder at a junction of the rotating disc valve and the engine cylinder, wherein during operation of the piston-driven combustion engine, said intermediate seal member seals the combustion chamber, said intermediate seal member being responsive to the pressure within the combustion chamber.

276. An intermediate seal member according to claim 275, further comprising a dynamic seal for contact with the rotating disc valve.

277. An intermediate seal member according to claim 276, wherein said intermediate seal member is in rotative contact with the disc valve.

278. An intermediate seal member according to claim 275, wherein said intermediate seal member further comprises a stationary seal for sealing contact with the engine cylinder.

279. An intermediate seal member according to claim 275, wherein said intermediate seal member seals the combustion volume within the combustion chamber.

280. An intermediate seal member according to claim 279, wherein said disc valve is in communication with a cylinder head comprising intake and outtake ports, said combustion volume being measured as the distance between the head of the engine piston and the cylinder head.

281. An intermediate seal member according to claim 280, wherein said intermediate seal member limits the axial length of said combustion volume.

282. An intermediate seal member according to claim 275, wherein said intermediate seal member is so responsive to said pressure of the combustion chamber as to move in the direction of the translational direction of the piston head during operation of the engine.

283. An intermediate seal member according to claim 275, wherein said disc valve is in communication with a cylinder head comprising intake and outtake ports, said intermediate seal member being so responsive to said pressure of the combustion chamber as to be moveable towards the disc valve.

284. An intermediate seal member according to claim 282, wherein said intermediate seal member is so responsive to said pressure of the combustion chamber as to push the disc valve towards the cylinder head.

5